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Running Head: FAST AND FRUGAL JUROR DECISIONS

Title: Are Consistent Juror Decisions Related to Fast and Frugal Decision Making?
Investigating the Relationship between Juror Consistency, Decision Speed and Cue
Utilisation.

Lee J. Curley^{1*}, Jennifer Murray¹, Rory MacLean¹, & Phyllis Laybourn¹

1. School of Applied Sciences, Psychology Subject Group, Edinburgh Napier University,
Edinburgh, Scotland, EH10 4BN.

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*Requests for reprints should be addressed to Lee Curley, School of Applied Sciences,
Psychology Subject Group, Edinburgh Napier University, Edinburgh, Scotland, EH10 4BN.
(email: Lee.Curley@napier.ac.uk)

Abstract

To establish whether more consistent/accurate juror decision making is related to faster decision making processes which use fewer cues, i.e. fast and frugal heuristic processes. A correlational design was implemented, with the co-variables: consistency of verdict decisions (participant decision compared to the actual court verdict), decision speed, and cue utilisation (the number of cues used to make a final verdict decision). Sixty participants read information about six murder trials which were based on real cases, and whose outcome verdicts were deemed to be correct by the Scottish legal institution. Three of the cases had been handed down 'not guilty' verdicts and three had been handed down 'guilty' verdicts. Participants read opening statements and were then presented with a block of prosecution evidence, followed by a block of defence evidence. They were then asked to make a final verdict. All three co-variables were significantly related. Cue utilisation and speed were positively correlated, as would be expected. Consistency was negatively and significantly related to both speed and cue utilisation. Partial correlations highlighted that cue utilisation was the only real variable to have a significant relationship with consistency, and that the relationship between speed and consistency was a by-product of how frugal the juror was. Findings support the concept of fast and frugal decisional processes being optimal when making juror decisions. The more frugal a decision is the more likely jurors are to be to be accurate/consistent.

Keywords: Law, Juror, decision making, speed, cue utilisation, fast and frugal

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Are More Consistent Juror Decisions Related to Fast and Frugal Decision Making?

Investigating the Relationship between Juror consistency, Decision Speed and Cue Utilisation.

Jury decision making has been noted as one of the most frequently researched topics within the fields of psychology and law, with a greater volume of trial/‘petit’ jury research than grand jury research being carried out (Hans, 1990). While most civil cases in the westernised criminal justice system are resolved through settlement (Hans, 1990), the significance of juries and the decisions that they facilitate within the criminal justice system is still high. This is because the types of cases that they sit on tend to be complex in nature, may hold public safety concerns, and tend to be hold greater severity than non-jury trial cases (Hans, 1990). In addition, the impact of a verdict within a trial holds significance beyond the trial itself, and for more people than the defendant and victim(s). There is also wider impact on the mental health and wellbeing of family members and friends of the defendant and the victim(s), and potentially to the community. It is therefore imperative that the process through which juries reach their decisions is understood, and that these processes are as accurate and legally just (fair) as they possibly can be.

While there have been many studies carried out investigating juror decision making outcomes, what is less well known is the process through which jurors form their judgements and make their final verdict decisions. To best understand the process of juror decision making and to identify whether it is accurate and effective, to the best extent that it can be, we propose that, in addition to the existing research investigating jury and juror decisions using outcomes data, carefully controlled experimental studies are required which move beyond forensic psychology and legal research methods, to incorporate decision science approaches: that is, the investigation of decisional styles of jurors, the amount and types of

information (decision cues) they use, the speed at which they make their decisions, and the associated accuracy of these decisions linked to these factors. Previous decision science research has studied decision making in environments where accuracy can be accurately measured, however. Nevertheless, in the current investigation accuracy cannot be measured, because the researchers did not know what actually occurred in the homicide scenarios, as they were based on real life cases. Although, the researchers can measure how consistent the verdict choices of mock jurors in the current investigation were with the verdict choices given by the real life jurors. Furthermore, the current quasi-experiment will empirically investigate if heuristic processes share a relationship with juror consistency, in a similar manner to how traditional decision scientists measure how heuristic processes relate to accuracy.

The current research therefore investigated whether heuristics (i.e., cognitive shortcuts to decision making; Tversky & Kahneman, 1974, 1981) were used by jurors when making decisions about different trials, and whether these heuristics were associated with the jurors' verdict choice consistency in comparison to those given by the real jurors of the trials selected. We argue that only through identifying naturalistic juror decision making processes, can we better understand them and, in time, shape juror specific guidance within the criminal justice system to best facilitate these processes. The current research is a first step in empirically identifying the naturalistic decisional processes of jurors.

A ground-breaking study by Dhami and Ayton (2001) investigated the decision making processes of judges in civil (non-jury) cases which sought to identify whether the defendant should be sentenced or released. The researchers were interested in the volume of information (number of decision cues) needed by judges to reach a decision about the case. The findings were surprising from a lay-perspective: judges' reached decisions using as little as one piece of evidence (or 'cue'), with the mean number of cues needed to reach a decision being 1.1. The findings indicated that rather than rationally weighting and evaluating all of

the available cues, judges used a heuristic decision making process, which allowed speed and small amounts of cues to be used to reach a decision: i.e., the judges were using Fast and Frugal decision making processes, specifically in this study, the Matching Heuristic (Dhimi & Ayton, 2001). This heuristic matches information from a specific case with a stereotypical version based on the decision makers own experience (Dhimi & Ayton, 2001). This, therefore, allows the decision maker to make efficient inferences from a frugal amount of relevant cues and their own experience. The matching heuristics may also be promoted in a court room because of time pressures (Dhimi & Ayton, 2001).

This research is meaningful to the juror decision making context as both the context around the decisions being made are similar, and the types of decisions are similar. Judges form judgements and make decisions under uncertainty (Dhimi & Ayton, 2001); so too do jurors. They do not have an opportunity to reflect on the outcomes of the decisions that they make, they are under time pressure, and the information that they have may be incomplete or piecemeal, reducing the opportunity for rational weighting of all variables. It may therefore be hypothesised that the decisional processes will be similar: jurors will use Fast and Frugal decision making processes in a similar way to judges. What is not easily drawn from this comparison, though, is whether these Fast and Frugal processes (if they are present) will be associated with a consistent verdict choice.

However, there are some differences between jurors and judges. For instance, judges have more experience and knowledge in relation to court cases than jurors. This lack of experience in jurors may actually promote fast and frugal decision making through. Gigerenzer & Goldstein (1996) suggested that decision makers use fast and frugal heuristics when they cannot base their decision exclusively from knowledge stored in the mind. Further, Gigerenzer and Goldstein (1996) proposed that having less knowledge surrounding a particular topic actually leads to more efficient and accurate decision making, as the less

expertise the decision maker has, the easier it is for them to differentiate between the outcomes available. Although, a knowledge base between an expert and a layperson is optimal in relation to fast and frugal decision making (Gigerenzer & Goldstein, 1996). Furthermore, a juror's lack of knowledge/experience may promote fast and frugal heuristics.

Previous decision making research has outlined and described in depth the processes through which judgements are formed and decisions are made. However, previous juror-specific decision making models, such as the Story Model (Pennington & Hastie, 1992) cannot give a good indication of juror accuracy (MacCoun, 1989). There are two overarching theories within decision science which may be more helpful in understanding juror decisions. One, fast and frugal heuristics, suggests that heuristics can be positive and may lead to correct decisions (Gigerenzer & Goldstein, 1996). The other, the heuristics and biases programme, focusses more on the negatives of heuristics and the biases they create (Tversky & Kahneman, 1974, 1981). It is not clear, in the context of juror decision making, however, whether heuristics are positive or negative in promoting decision accuracy/consistency.

Tversky and Kahneman (1974, 1981) revolutionised decision making research by suggesting that rational models, were optimal. However, they suggested that human decision making was not always rational. In their pivotal work, Tversky and Kahneman, (1974, 1981) proposed that heuristics allowed individuals to make judgements which were quick and easy (Sanfey & Chang, 2008), yet *potentially* biased. Critics, however, suggest that we need to look at more than the internal processes when we study decision making (Simon, 1956). In contrast, Gigerenzer and Goldstein (1996) proposed that fast and frugal heuristics may be useful for individuals, allowing them to differentiate between opposing alternatives (Gigerenzer & Goldstein, 1996). Gigerenzer and Goldstein (1996) suggest that heuristics are non-compensatory, adaptive, and that a diverse set of heuristics may be available to decision makers. This allows individuals to adapt their decision making strategies to environments

based on the fact that certain rule of thumb techniques may be better suited than others (Mellers, Shwartz, & Cooke, 1998), supporting the notion that an information search that is biased may be positive, as it points people in the right direction (Snook & Cullen, 2008).

The fast and frugal model described by Gigerenzer and Goldstein (1996) is a probabilistic mental model, which suggests that decision makers can make fast and frugal inferences based on known cue validities, if information from memory cannot be used on its own (Gigerenzer & Goldstein, 1996; Gigerenzer, 2002). These quick inferences, which are based on relatively few pieces of information can lead to accurate decisions (Gigerenzer & Goldstein, 1996); contradicting rational theories of decision making, as there is no accuracy versus speed trade off (Brown & Heathcote, 2008; Gigerenzer & Goldstein, 1999; Lee, Newell, & Vandekerckhove, 2014). The point where information search halts within these models is called the stopping rule. The stopping rule is promoted when a cue is found that allows one of the outcomes to be favoured. The outcome that is favoured by the satisficing cue is then favoured (i.e. the decision rule; Gigerenzer & Goldstein, 1996). Further, the outcome that has a positive match with the discriminatory cue will be chosen if the other outcomes relationship with the cue is either negative or unknown. In summary, information search continues from the decision makers memory until *satisfying* information is found, which then allows a decision to be made (Gigerenzer & Goldstein, 1996).

Gigerenzer and Goldstein's (1996) frugal algorithm has been shown to relate to highly accurate decisions being made (Gigerenzer & Goldstein, 1996). For instance, Gigerenzer and Goldstein's (1996) found that students were better at making decisions when they had less knowledge of a particular area (e.g., city size) and were frugal in their use of cues (Gigerenzer & Goldstein, 1996). This highlights that biases towards using a small amount of information may improve performance (Snook & Cullen, 2008).

Both of the heuristic models discussed have different implications for the court room. Fast and frugal models would suggest that lengthy trials may decrease decision accuracy. Further, they would suggest that by cognitively overwhelming the juror, it is harder for them to distinguish between valid cues and 'noise'. In contrast, the heuristics and biases programme would suggest that regardless of what the court does the same outcomes will occur. For instance, if a lot of information is provided, jurors will ignore this information and use extra-legal factors such as race and gender to make sub-optimal decisions. And, if jurors are provided with a small amount of information, jurors will probably still rely on heuristics and cognitive fallacies, and may then utilise extra-legal information, such as gender and race, when making decisions, thus deviating their decision making processes from a more rational approach (Dhimi & Ayton, 2001; Gigerenzer & Goldstein, 1996; Tversky & Kahneman, 1974, 1981).

It is clear that there is contradictory evidence in regards to the implications of heuristics. The main elements of this contradiction focus on cue utilisation, the speed at which a decision is made, and the consistency of the decision. There is currently a dearth of research specifically investigating juror decision making within the fast and frugal paradigm, with the majority of existent research focusing on juror 'stories' or decisional outcomes (e.g., Pennington & Hastie, 1992). The current research will investigate these variables to establish whether heuristic processes are present in jurors, and whether these are associated with consistency verdict choice. It is hypothesised that:

H₁: There will be a significant association between decision making speed and verdict consistency.

H₂: There will be a significant association between verdict consistency and cue utilisation.

H₃: There will be a significant and positive association between cue utilisation and decision making speed.

Method

Design

The research used a correlational design to investigate relationships across three co-variables: speed (time it took individuals to make a decision); cue utilisation (number of cues used calculated based on the last cue the participant needed to make a decision); and verdict consistency (whether participants made verdicts that were correct, based on the outcome given in the real life trials).

Participants

Sixty participants (31 females, 29 males) with a mean age of 26.8 years (SD = 9.6 years) took part in the study. Twenty-one participants were students, with the remaining participants being a mixture of unemployed, professionally and manually employed individuals. Overall 360 decisions were made (60 participants made judgements on six trials each), which indicates a suitable range and number of judgements being made and is comparable to other respected research using vignette based decision making tasks (e.g., Dhimi, 2003, at 342 judgements). Three post hoc G*power tests were conducted to test the power of the statistical tests (Faul, Erdfelder, Lang, & Buchner, 2007). The G*power was ran with a Bivariate normal model, with two tails, and error probability of .05, and a total sample size of sixty. Three different effect sizes were input through. The first G*power analysis investigated the power between consistency and speed, a medium effect size of .34 was input, an observed power of .77 (or .8 when rounded to one decimal place) was output. The second G*power analysis investigated the power between cue utilisation and consistency, the effect

size of .42 was input, and a power of .93 was observed. Finally, the last G*power analysis investigated the power between cue utilisation and speed, a large effect size of .73 was input, and an observed power of .99 was output. Furthermore, all correlations were adequately powered.

Opportunity sampling and snowballing techniques were employed, placing posters and recruitment advertisements both on university campuses and via social media, with participants being encouraged to pass on the study details to others. To increase ecological validity and align with eligibility for Scottish juror selection (Scottish Court Service, 2015; the study was based in Scotland), the inclusion criteria dictated that participants were to be aged between 18-65 years. The exclusion criteria indicated that people could not participate if they had been sentenced in court in the last five years, if they had been imprisoned for three months within the last seven years, or if they were not on the electoral role.

Materials

All participants received standardised information sheets, consent forms, and debriefing sheets. The information sheet contained details about the study and researchers, and also contained a slight deception: that the results of the research were going to be used by lawyers for appeals, to induce a greater sense of importance. This was later revealed as false in the debriefing sheet at the conclusion of the study. A demographics questionnaire was given which asked for participant gender, age, and occupation.

Vignettes. Six vignettes were developed based on real cases for this research: three described cases which had received a Guilty verdict in the real world sitting, and three described cases where a Not Guilty verdict had been received. Participants viewed all vignettes. The development of the vignettes followed published guidance on vignette development (i.e. Ashill & Yavas, 2006; Heverly, Fitt, & Newman, 1984). The vignettes in

the current experiment were similar lengths to prevent biases in terms of how much each case was attended too. The cues (pieces of evidence) shown in the vignettes were all relevant to the research aims. All of the vignettes provided the names and genders of the suspects and victims. Across the vignettes, consistent information was shown in comparable orders (in line with vignette development guidance by Murray et al., 2016). Prosecution evidence was always shown first, followed by defence evidence. Finally, vignettes were developed to be moderate and similar in length. See Appendices 1-2 for more information regarding vignette development and balancing.

The case information contained in the vignettes was drawn from real cases which had been tried by jury in Scotland, and which were reported in newspapers and/or court transcripts, freely available online. The names of the individuals and places from the real life trials were changed. All cases had a specific Guilty or Not Guilty verdict, which had either not been appealed or which had been upheld following appeal.

The ages and gender of the suspects and victims in the cases were similar, and the criminal charge (homicide) was the same. Piloting was carried out to ensure that the realism, severity, and familiarity of the cases were similar throughout the six trials (see Appendices). Vignettes were on average 484 words long. The mean opening statement length for guilty verdicts was 115 (SD = 7) words, and the mean length of the opening statement was 115.67 (SD = 12.58) words; a paired samples t-test indicated that there was no significant differences in relation to word length between the different types of cases ($t(2) = -0.19$, $p = 0.87$, $d = 0.07$). The types of evidence were also similar throughout: biological, eyewitness, and secondary confession evidence were used.

Vignettes contained between 10-18 pieces of evidence (cues); 5-9 pieces of evidence for each prosecution and defence across the trials. The rationale for the number of cues was to keep the evidence number for each stance between Miller's (1956) 7 ± 2 working memory

rule to ensure that the volume of information would not lead to cognitive overload and impede memory. The number of cues varied between trials to allow the trials to be as generalizable as possible as trials do not always present the same number of cues.

The six vignettes were presented using the software Super-Lab (version .50), with the order of the trials being counterbalanced after every 20 participants to reduce potential order effects. Super-Lab was used to track progress, collect the participant input data (see procedure) and to record response speeds.

Procedure

Participants read a standardised information sheet and completed a consent form prior to participation. They were then asked the juror eligibility questions and completed their demographic information. Participants were given on-screen instructions of how to respond in the trials and also had a printed copy of the instructions beside them. For each trial, they were provided with an opening statement, to provide context to the case. Participants were then asked to read over individual pieces of evidence (ranging from 10 pieces on the smallest case to 18 on the largest case), and were asked to rate each piece of evidence as ‘G’, ‘N’, or ‘P’ (guilty, not guilty, not proven, respectively) and in a likelihood rating of 1 to 100 (1 representing definitely not guilty, 50 showing the verdict has not yet been proven and 100 symbolising definitely guilty; see footnote for more details here). Once all of the evidence (cues) had been rated, participants were asked to give a final verdict. There were three verdicts available: guilty (G), not guilty (N) and not proven (P). Participants were then asked to state the last piece of evidence they needed to reach a decision. This highlighted the last cue needed by a participant, which then allowed an overall response time to be calculated in relation to making a decision. Likewise, it allowed an absolute stopping rule, in line with fast

and frugal heuristics, to be quantified. Once the participants had completed all trials, they were fully debriefed.

Results

Three outliers were present, which occurred in the variable ‘consistency’. The outliers were not removed due to the small sample and the small numbers of outliers. Response time data within one participant for one case was missing due to an error in the data collection using Super-Lab. These data were treated as missing and were imputed as averages. Two participants chose not to provide a final verdict on trial six. A mean consistency score was calculated for each participant.

The data were averaged for each of the six trials per participant for Pearson’s correlations to be conducted. In each of the six trials, a judgement of ‘Not Proven’ was marked as incorrect (i.e. coded as zero) and a Not Guilty verdict given in a guilty trial (or vice versa) was also coded as incorrect. Correct verdicts were coded as ‘1’. The number of correct verdicts over the trials were added together, and then divided by six, which then allowed averaged data to be produced. Table 1 shows the descriptive statistics for the averages of participants’ verdict consistency, decision speed (measured in milliseconds), and cue utilisation over the six trials.

Table 1 about here

Pearson’s correlations were carried out to investigate whether there would be relationships across the co-variables consistency, speed, and cue utilisation. The correlation coefficients and coefficients of determination are shown in Table 2.

Table 2 about here

All three co-variables were significantly related, with consistency and speed demonstrating a significant, moderate, negative relationship ($r(60)=-0.34$, $p=0.01$, $r^2=0.12$). This indicates that with a shorter time taken to reach a verdict, the more likely the participants were to be consistent. There was also a significant, moderate, negative relationship between consistency and cue utilisation ($r(60)=-0.42$, $p=0.01$, $r^2=0.18$), indicating that the fewer cues that a person needs to reach a verdict, then the more consistent they were likely to be.

In contrast, the relationship between speed and cue utilisation were significant, but positive and with a large effect size ($r(60)=0.73$, $p<0.001$, $r^2=0.53$). This indicates that the longer it takes an individual to reach a verdict, then the more cues the person will have utilised in their decision making process; as would be expected .

A partial correlation was then carried out, controlling for speed in the relationship between cue utilisation and consistency. The correlation coefficient was found to decrease: ($r(57)=-0.27$, $p=0.04$, $r^2=0.07$). This indicates that, regardless of speed, the less cues that a person uses the more consistent their decision will be. When cue utilisation is controlled for when investigating the relationship between speed and consistency the relationship becomes non-significant: ($r(57)=-0.049$, $p=0.71$, $r^2=<0.01$).

Discussion

Statement of principal findings

The current research investigated whether speed, consistency and cue utilisation were significantly related in a juror decision making context. It was hypothesised that there would

be a significant association between speed and consistency, cue utilisation and consistency, and speed and cue utilisation; with the former two hypotheses being key in identifying whether jurors are following fast and frugal type decisional processes to reach more consistent verdict choices. All three hypotheses were supported.

The findings indicated that as the time that a juror takes to make a decision increases, their consistency decreases. Previous theoretical arguments have demonstrated conflicting propositions in regard to the time taken to make decisions and consistency. For instance, the heuristics and biases programme suggested that quick decisions may cause inaccuracies (Tversky & Kahneman, 1974). Conversely, fast and frugal theorists have proposed that quick decisions have good accuracy rates (Gigerenzer & Goldstein, 1996). The current findings support the latter approach: that the quicker a juror's decision is reached, the more consistent the jurors decisions were in regards to previous real life verdicts. Once again, it should be mentioned that in previous decision making literature that accuracy is a commonly studied variable. However, accuracy could not be measured in the current investigation because the trial vignettes were based on real life cases, and the researchers did not know what the appropriate outcomes of the cases were. Therefore, it was deemed appropriate to instead measure consistency (how similar mock juror verdicts were with the verdicts given by the real life jurors). Further, the researchers used the term of consistency in the current investigation, where other decision science investigations have used the term accuracy, in an attempt to see if jurors use heuristics.

Similarly, the findings indicated that those jurors who used fewer cues actually demonstrated superior consistency in their verdict decisions. As with the previous speed/consistency relationship, the previous research and theoretical bases for directioning this hypothesis are conflicting. Tversky and Kahneman's (1974) approach would propose that the more frugal the decision making strategy was, the more potentially biased the mock juror

could be. This may then lead to an incorrect verdict (Findley & Scott, 2006). The theories proposed by Gigerenzer and Goldstein (1996) and Simon (1956), however, would suggest that the more frugal the individual was in cue utilisation, then the more likely they would be to give a correct response.

In addition, as Fast and Frugal jury decision making appears to correlate with accurate/consistent decision making, lawyers may consider ordering their evidence in a way that promotes certain heuristics. For instance, if lawyers order their evidence along a validity gradient, from most valid to least valid piece of evidence, they may promote frugal decision making processes to occur, which may then promote consistent and efficient decision making to occur. By placing DNA evidence first, for example, followed by weaker pieces of evidence, it may allow jurors to reach their decision frugally and accurately, making jury deliberations and court cases, in general, more efficient.

Considering the importance of the speed of decisions versus the number of cues used, and their relationship to consistent verdict choices, when speed was controlled for, cue utilisation and consistency maintained their significant relationship. This means that the relationship between cue utilisation and consistency is not due to speed. Thus, the fewer the cues used when making a decision as a juror, the more likely an individual was of being consistent, regardless of speed. It can, therefore, be argued that the more frugal a decision maker is the more consistent they will be. It was also found that when cue utilisation was controlled, the relationship between threshold speed and consistency became non-significant. This would then suggest that merely making a decision quickly does not mean that you will reach an accurate/consistent decision. What really matters in reaching an accurate decision is frugally using cues. The current piece of research may therefore suggest that frugality is more important than quickness in the jury context. In other words, individuals who use a

satisficing amount of cues are more likely to both make decisions quickly and are more likely to reach accurate outcomes (Gigerenzer & Goldstein, 1996).

Strengths and weaknesses of the study

The current research is the first empirical support of fast and frugal research within a juror context, to the authors' best knowledge. However, theoretical research from Snook and Cullen (2008) also suggested that 'biased' decision making may be beneficial in a theoretical context. These researchers focussed on tunnel vision, which suggests that police officers, and potentially jurors, use biased decision making mechanisms to only use a satisficing amount of evidence (Snook & Cullen, 2008). The researchers proposed that it is unlikely that humans in a legal setting can use all the information provided to come to a rationally weighted outcome (Snook & Cullen, 2008). They also highlight that using realistic (i.e. fast and frugal heuristics) decision making strategies, rather than traditional normative rationality, may actually help individuals who analyse forensic and legal information in order to make an accurate decision (Snook & Cullen, 2008). The same process may be occurring in the present findings. These two studies, taken in consort, indicate that fast and frugal processes may allow decision makers to make accurate/consistent and efficient decisions.

The research was also conducted using a computer in a lab-based setting. This artificial setting, with the lack of real-life, social cues, may have affected the decision making processes of the participants, and made what was observed in this experiment different from what may have occurred in a real-life experiment (Simon, 1956; Wiener, Krauss, & Lieberman, 2011). For instance, the length of the trials were necessarily relatively short in this experiment, with the duration of completing the experiment varying between 50-90 minutes. This may, therefore, affect the decision making process in a number of ways, such as promoting biases. This preference on speed, and the fact that less information was

available may have promoted the use of satisfying, which may explain some of the results that were found (Gigerenzer & Goldstein, 1996).

It is unlikely that the lack of ecological validity did affect the decision making processes of the jurors, though. Results from previous research that focussed on ecological validity and its effects (Pezdek, Avila-Mora, & Sperry, 2010) found that no significant differences were observed between participants using transcripts vs participants viewing filmed vignettes. This may then highlight that decision making process is not affected by ecological validity (Hastie, Penrod, Pennington, 1983; MacCoun, 1989).

Meaning of the study: possible mechanisms and implications for clinicians or policymakers

The current research findings indicate that heuristics may be beneficial to decision makers in a legal environment: jurors who use a small number of cues demonstrate increased consistency in comparison to those who use more cues. This suggests that satisficing may be beneficial (Gigerenzer & Goldstein, 1996; Simon, 1956). The findings therefore do not support the applicability of the heuristics and biases programme (Tversky & Kahneman, 1974) or normative approaches within juror decision making, but instead appear to support fast and frugal (or specifically frugal) heuristics, which suggest that heuristics can lead to accurate/consistent decisions, and that heuristics may be an essential part of human decision making (Gigerenzer & Goldstein, 1996). However, the current investigation has not highlighted which pieces of information may allow a decision to be reached quicker. Previous research from Tversky and Kahneman (1974) suggested that the first piece of information provided to the decision maker acts as an anchor and may then effect the rest of a decision. Therefore, the first piece of evidence presented in court may anchor the juror's perception of guilt, thus having an asymmetrical effect on rest of the juror's decision making process.

Gigerenzer & Goldstein (1996) proposed that valid pieces of information, like DNA evidence, that allow outcomes, such as guilty and not guilty, to be discriminated against, cause decisions to be made frugally and accurately. Consequently, future research would like to test the effects that evidence order and validity may have on both juror decision processes and verdict frequency.

This support for the fast and frugal approach has implications both academically and practically. It proposes that Fast and Frugal heuristics are used in the courtroom to make decisions that may be consistent. This is somewhat counterintuitive and needs further research, with larger samples and across less experimentally controlled, more ecologically valid research settings. Nevertheless, the current findings may tentatively imply that short cases, which are straight to the point and which only present case-relevant and non-piecemeal information to jurors may be more beneficial to the legal system in terms of time/cost-effectiveness in decision making time and in accurate/consistent juror decisions.

Should the findings of this early study into jury decisional processes and consistency hold in replications and related future research, strong implications for the current jury processes within the criminal justice system must be considered. There is the potential to restrict the amount of information presented in court, and for only the most valid pieces of information to be presented in court. By ensuring that the legal environment is non-compensatory, it may promote fast and frugal decision making to occur, thus increasing the likelihood of jurors giving an accurate/consistent outcome (Gigerenzer & Goldstein, 1996).

Unanswered questions and future research

Future research would be advised to aim to disentangle the processes behind the results in the current research. The results showed that consistency is negatively related to cue utilisation. But, what process is driving this? One explanation may come from Gigerenzer

and Goldstein's (1996) fast and frugal heuristics. Another alternative explanation may be that the stopping point be relative, mirroring a threshold model where information is integrated until a boundary is reached (Ratcliff & Smith, 2004). Future research will investigate which metaphor of decision making, either heuristics or thresholds, is most applicable to juror decision making.

The current findings suggest that Fast and Frugal decision making processes may be beneficial to juror decision making. This has significant implications for psychologists and legal scholars as it may highlight that heuristics may be beneficial to jurors; in contrast to the very deliberative and drawn out existing structures and processes associated with courtroom trials. Specifically, frugal cue utilisation seems important in order for accurate decisions to be reached. Future research in more ecologically valid settings, such as mock trial settings and including group dynamics within the research design would be beneficial in identifying whether the current findings hold true in less controlled experimental settings.

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Footnote

The cue ratings (i.e. whether participated counter the evidence as G, N or P and likelihoods) were not used in the current analysis, as a future paper will focus on this. Also, the not proven verdict is generally considered as the middle verdict, yet it is not legally defined (Duff, 1999).

Not proven cases were not used in this analysis, as the definition of not proven means that the verdict cannot be correct as the person was either guilty or not guilty. Therefore, not proven cases were omitted from this study. Not proven outcomes could be given though, because in a Scottish court room it is possible for a jury to wrongly give a Not Proven verdict, when they should have gave a guilty (or a not guilty) verdict.

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Ethics

The research integrity committee at Edinburgh Napier University granted the current investigations ethical approval. The reference number is FHLSS/1374.

Table 1

Table 1: Descriptive statistics for the verdict consistency, decision time to reach verdict (speed), and cue utilisation.

Variables	Minimum	Maximum	Mean	Median	Standard Deviation
Verdict	0	0.7	0.3	0.3	0.2
Consistency					
Speed (ms)	39921.7	214130.5	110731.4	174208.8	37662.3
Cue Utilisation (N)	3.8	12.8	9	9.3	2.1

Table 2.

Table 2: Pearson's r and r^2 values across the three co-variables.

	Speed		Cue Utilisation	
	r	r^2	r	r^2
Consistency	0.73**	0.54		
Cue Utilisation	-0.34*	0.11	-0.42*	1.17

* $p < 0.01$, ** $p < 0.001$

Appendices

Appendix 1. Counterbalancing table supporting the vignette design process: descriptive details about the case.

	Guilty	Not Guilty
Familiarity with Victim	2 familiar, 1 not	1 familiar, 2 not
<i>Vulnerable Victim</i>	<i>2 vulnerable, 1 not</i>	<i>1 vulnerable, 2 not</i>
Crime Type	Housebreak/stabbing Argument/multiple injuries Body not found	Head injury/strangled Neck injury/oxygen affixation Self-defence/stabbing
<i>Victim ages (years)</i>	<i>51, 16, 33</i>	<i>19, 44, 26</i>
Victim Gender	2 female, 1 male	1 female, 2 male
<i>Accused Ages (years)</i>	<i>20, 22, 39</i>	<i>23, 33, 49</i>
Accused Gender	3 males	3 males
<i>Weapon Used</i>	<i>2 yes, 1 unknown</i>	<i>2 yes, 1 no</i>
Opening Statement Length (N)	123, 110, 112 Mean =115	129,104, 114 Mean=115.7

Appendix 2. Counterbalancing table supporting the vignette design process: details of number of cues across prosecution and defence evidence, severity ratings, participant familiarity ratings, and participant rated realism ratings. The latter three ratings were determined in pilot trailing of the vignettes.

	Guilty	Not Guilty
Number of Prosecution		
Evidence Cues	7	6
<i>Number of Defence</i>		
<i>Evidence Cues</i>	7	6
Severity (mean)	4.13	4.02
<i>Familiarity (mean)</i>	2.00	2.06
Realism (mean)	3.58	3.90

Note. Severity, Familiarity and Realism rated on 1-5 point scales, with higher scores indicating higher ratings.